Plate vs. Nail: Is there a More Effective Implant for Extreme Tibia Fractures?

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INTRODUCTION: The purpose of this study is to determine differences in outcomes between "extreme" tibial metaphyseal fractures treated with intramedullary nailing or plate osteosynthesis.

METHODS: 545 patients that were prospectively collected were reviewed by two board-certified orthopedic trauma surgeons to identify extreme tibial shaft fractures (defined as most proximal or distal segments that involved or would have involved the area encompassed by the nail locking bolts). Twenty-five patients with 25 fractures were treated with an intramedullary nail and compared to 26 patients treated with plate and screws for similar patterns were identified. Data collected included patient demographics, surgical details, and outcomes. Cohorts were compared for significance using fisher's exact test and independent T tests. Multivariable analysis was used to evaluate the association of fracture type to covariates.

RESULTS: The mean age of all patients was 46.73 years. There were no differences in ASA score, CCI, age, male/female composition, or BMI between cohorts. There were no differences in low vs. high-energy mechanism of injury between cohorts, however the IMN cohort had a greater proportion of open fractures (p = 0.007). When controlling for differences in age, sex, BMI, CCI, ASA, injury mechanism, closed vs. open fracture, and tobacco use status, patients who underwent IM nailing of their extreme tibial fractures were allowed earlier weight bearing on the operative extremity. For both distal and proximal tibial fractures, there were no differences in ankle or knee range of motion at latest follow up. There was a greater incidence of total complications among IMN patients compared to plate osteosynthesis patients (p = 0.029). Single variable analysis revealed an association between IMN and nonunion (p = 0.025). There was a trend towards a greater need for reoperation among patients who underwent IM nailing of their extreme tibial fractures (p = 0.084). Patients underwent reoperation primarily to address hardware-related pain, infection, and nonunion. DISCUSSION AND CONCLUSION:

Intramedullary nailing of tibia fractures with distal and proximal metaphyseal involvement (extreme tibia fractures) was associated with higher rates of total complications compared to plate osteosynthesis and trended with greater need for reoperation. However, it should be noted that there was a higher incidence of open fractures in this cohort. There were no differences in the rate of malalignment, range of motion, or time to healing between cohorts. Intramedullary nailing is associated with earlier weight bearing which can allow patients to more readily return to pre-injury function.